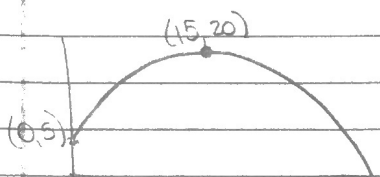


Dakota throws her pom-pom in the air from a height of 5ft. It reaches its highest point 15ft. away from her, 20 ft in the air. Sahara stands 28 feet away from her & jumps so that her hands are 6ft. in the air. Does she catch the pom-pom?



$$y = a(x-15)^2 + 20$$

$$5 = a(0-15)^2 + 20$$

$$5 = a(225) + 20$$

$$-15 = a(225)$$

$$-\frac{1}{15} = a$$

$$y = -\frac{1}{15}(x-15)^2 + 20$$

$$6 \stackrel{?}{=} -\frac{1}{15}(28-15)^2 + 20$$

$$6 \neq 8\frac{1}{3}$$

Sahara does not catch the pom-pom.

If Sahara does not catch it, where should she stand so that she catches it at 6ft in the air?

$$6 = -\frac{1}{15}(x-15)^2 + 20$$

$$-14 = -\frac{1}{15}(x-15)^2$$

$$210 = (x-15)^2$$

$$14.5 = x-15$$

$$29.5 = x$$

$$-14.5 = x-15$$

$$0.5 = x$$

She should stand 0.5ft or 29.5ft. away from Dakota.

If Sahara misses again, how many feet away from Dakota will the pom-pom land?

$$0 = -\frac{1}{15}(x-15)^2 + 20$$

$$300 = (x-15)^2$$

$$17.32 = x-15$$

$$32.32\text{ft}$$

$$\text{or } -17.32 = x-15$$

$$\text{or } -2.32$$

32.32ft away

How high will the pom-pom be when it is 8ft. From Dakota?

$$y = -\frac{1}{15}(8-15)^2 + 20$$
$$\boxed{y = 16\frac{4}{5} \text{ ft}}$$

How many feet away from Dakota will the pom-pom be when it is 18ft in the air?

$$18 = -\frac{1}{15}(x-15)^2 + 20$$
$$-2 = -\frac{1}{15}(x-15)^2$$
$$30 = (x-15)^2$$
$$5.48 = x-15 \quad \text{or} \quad -5.48 = x-15$$
$$\boxed{x = 20.48 \text{ ft or } 9.52 \text{ ft}}$$

In the first problem, Sahara did not catch the pom-pom. How far would Dakota have to move in order to throw it so that Sahara catches it?

You know that the pom-pom is 6ft. high at 29.5ft away from Dakota. Sahara stands 28ft away. Therefore, Dakota needs to move 1.5 ft back away from Sahara. Her new equation would be $y = -\frac{1}{15}(x-13.5)^2 + 6$